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Gamification at Workplace: Theories, constructs and conceptual frameworks

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Abstract

Gamification has been an active area of interest for both academicians and practitioners for the last decade. Gamification has extended its application to many areas, including the workplace. This study aims to shed light on the theoretical scenario of the gamification literature at the workplace. The article reviews the recent literature on gamification in this context and analyses the theories, constructs, and frameworks used to study the phenomenon. There is a lack of focus on the theoretical framework in the existing reviews. We create a broad taxonomy of theories used in the literature of gamification of the workplace. Further, we also propose a causal-chain framework to explain how gamification influences employees in the workplace. The results indicate that gamification at the workplace is still in its nascent stage and requires more rigorous and in-depth research. We believe that the insights generated provide research avenues for future research studies.

Keywords Gamification, Work, Literature Review, Causal-chain framework

1 Introduction

Gamification is a phenomenon that has attracted the attention of researchers and practitioners alike in the last decade. It is defined as the use of gaming concepts in non-gaming contexts (Deterding et al., 2011). The scope of gamification spans over many application areas, becoming increasingly relevant in organizations with the rise of Industry 4.0 (Wanick and Bui, 2019). The rise of technological integrations with motivational systems at the workplace better facilitates the application of gamification (Koivisto and Hamari, 2019).

In this article, we attempt to review the recent literature of gamification at the workplace and present a broad taxonomy of theories used in previous studies. Further, we explore the causal relationship between constructs studied at the workplace and present a framework to explain how gamification influences individuals. We believe that this paper can contribute to the body of literature in gamification, and provide a necessary reference for future gamification research.

Periodic reviews ensure the expansion of the boundary of existing research. Notable work in gamification review at the workplace has been done previously to provide research motivation (Ferreira et al., 2017). Existing reviews have focussed on developing categories of areas or domains where gamification has been applied, types of research, methodologies, and outcomes of gamification (Wanick and Bui, 2019; Koivisto and Hamari, 2019). Our research initiative extends these research reviews by focusing on developing a taxonomy of theories and concepts in the gamification of workplace literature, which have not received enough attention in these studies.

While these review studies have made a considerable contribution to understanding gamification at the workplace and analyzing its current research scenario, our study is different from them in its contribution to literature. Firstly, we aim to create a broad taxonomy through extraction of theories used to explain gamification and its effects in the recent literature. We discuss the relevance and applicability of these theories in the gamification environment. We further discuss the advantages and disadvantages of applying these theories at the workplace. Secondly, we explore and visit all the variables and constructs used in gamification contexts to present a causal chain framework. This framework not only presents insights to the current research scenario but also combines the extant literature to provide a unified framework, paving the way for future research directions. The analysis is expected to act as roadmap to generate new ideas in this research area.

We start by explaining the methodology used to select and filter the articles for this study and subsequently present the analysis of all the studies. Next, we present the taxonomy of theories developed, and present the causal-chain framework leveraging the detailed literature review. Finally, implications and future research directions are presented before concluding.

2 Research methodology

Steps provided by Kitchenham (2004) were followed to conduct the systematic literature review. The search scope was limited to the timeframe of 2016-20, as this article aims to review the recent studies of gamification at the workplace. An indexed search of the articles was conducted using Google Scholar and Scopus. The keywords used for the initial search were “gamification”, with a combination of “workplace”, “company”, “enterprise”, or “employees”. First, we screened the articles based on titles and abstracts. We constrained our search to conference papers and journal articles. Both the authors screened the articles independently then combined the results. Any conflict or disagreements in the results were resolved by reaching consensus after a detailed discussion. Subsequently, forward and backward reference searching was applied to search for more articles. Finally, the search was refined based on removing any duplicate articles. The full-texts of these articles were accessed for the review.

The initial search resulted in more than 600 articles. After screening articles through a reading of the abstract and title, 97 articles were selected to check eligibility. Additionally, 38 more articles were selected based on forward and backward reference searches. After removing duplicate studies, book chapters, reviews, and partially available articles, 75 articles were selected. Out of these 75 articles, 31 articles were further excluded after reading the full-text as they did not meet the research objective of the study. This study aims to review theories, constructs, and conceptual frameworks used to explain the phenomenon of gamification. Articles that did not reference any theory and did not analyze any operationalized variables were removed from the selected list. We also eliminated articles that were not in English at this stage. The final list contained 44 articles for review and detailed analysis. The

articles were only chosen if they discussed implementations of gamification at the workplace or theoretically analyzed the gamification phenomenon. The literature review in this study is not exhaustive, but it still presents relevant results as the articles chosen are representative of the recent research agenda. Figure 1 details the review process used to select the articles.

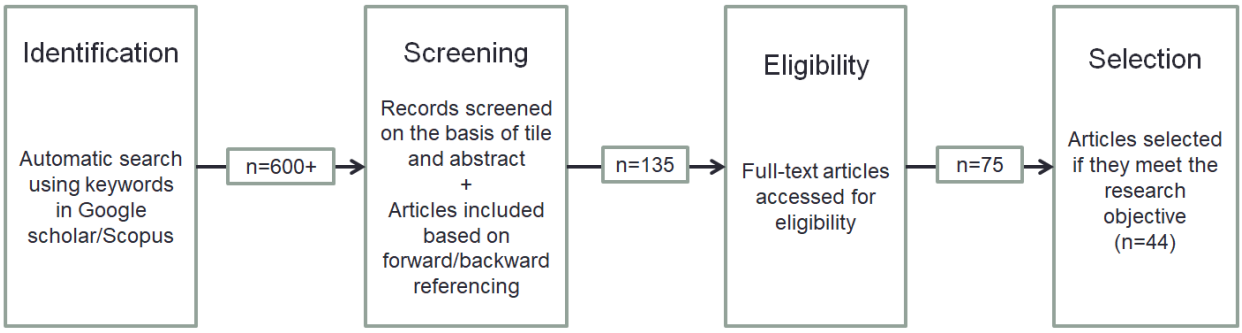

Figure 1: Review Procedure (adapted from Kitchenham (2004), Ferreira et al (2017))

3 Results and Discussion

3.1 Theories and models

The theories used in the articles selected for review were categorised into four broad categories – personal behavior theories, goal-based theories, workplace-based theories, and game-based theories. Many different theories and models have been used in the literature to explain and understand the phenomenon of gamification and its effects on the workplace. In this section, we summarize and discuss these theories. Table 1 lists the theories that have been categorized under the four categories.

3.1.1 Personal Behaviour Theories

The first group of theories explains gamification and its effect using theories situated in a personal or individual level of behavior psychology. There are a total of 21 theories in this group. The relevance of personal behavior theories is evident from their extensive usage in the gamification literature. One of the most significant objectives of gamification is altering the behavioral outcome of the participants, and personal behavior theories provide avenues to understand these outcomes from an individual's perspective. Especially when exploring outcomes such as engagement and commitment, behavioral theories have been used and relied upon for many decades by both practitioners and academicians (Gawel, 1996). These theories deal directly with the psychological outcomes that lead to the desired behaviors.

For instance, self-determination theory (SDT) is the most frequently used theory as it deals directly with intrinsic and extrinsic motivations. Motivational affordance being a critical outcome of gamification implementations, provides insights into need fulfillment and employee behavior. SDT posits that the fulfillment of certain needs is necessary for psychological wellness and high performance (Deci and Ryan, 2014). Similarly, the flow state, as defined by the theory of flow, is a mental state where the participant is fully engaged in an activity with heightened enjoyment (Czikszentmihalyi, 1990). It also forms a basis for other theories, such as the Mechanics-Dynamics-Aesthetics (MDA) framework and the theory of aesthetic experience. Another example is affordance theory, which states that the relation between an object and the user is determined by the object's affordance as perceived by the user.

One of the possible drawbacks of using personal behavior theories to study gamification is its lack of focus on the workplace. Richards et al. (2014) argue that the context forms an integral part of the gamification implementations, and its characteristics should be thoroughly analyzed and understood before designing gamification environments for successful implementations.

3.1.2 Game-based Theories

The second group of theories contains those theories that have been borrowed from games or have been explicitly developed for gamification implementations and design. This group contains six theories and models, a few of which are discussed here. The relevance of game-based theories to gamification understanding can be attributed to its focus on introducing the element of 'play' at work. The idea behind these theories is that gamification provides significant hedonic benefits which, when combined with the utility enforcement aspect, can lead to increase in enjoyment of work. It is looked

upon as a new way of working, which provides "productivity through fun" (Koivisto and Hamari, 2019). The importance of enjoyment in the workplace is a theme that can be observed in the literature. For instance, Schaufeli and Salanova (2007) point to the importance of enjoyment in well-being and employee engagement at work and posit that a lack of enjoyment will lead to burnout.

The Octalysis framework presented by Chou (2015) presents eight core drives that are responsible for motivations in humans. The framework posits that these eight drives, when managed efficiently, lead to user engagement. Similarly, the MDA framework breaks the elements in a game into three layers of mechanics, dynamics, and aesthetics to analyze the interplay between these elements. The concept has been extended by gamification studies to study and understand different elements and apply gamification in the non-gaming contexts (Kotsopoulos et al., 2017; Nivedhitha and Manzoor, 2019; Cunha et al., 2016).

The analysis and understanding of the characteristics of the participants in a gamified environment has been cited as an important factor for the success of gamification implementations (Tondello et al., 2016). Classification models for these user types have been presented in the literature. Bartle's user type is one such example of user classification, which has been borrowed from the traditional game literature (Bartle, 1996). Hexad user-type model is another example that presents a classification framework primarily aimed towards gamification design and implementations (Tondello et al., 2016).

These theories have been criticized for being too dependent on extrinsic motivation and often gamification implementations are reduced to reward-based mechanisms (Hung, 2017). Gamification should not be over-extended to treat its implementations as games, which may lead to reduced effectiveness (Çeker and Özdaml, 2017). Further, addiction is another challenge that might arise from the parallels between gamification and games (Andrade et al., 2016), which needs to be researched in more detail.

3.1.3 Workplace-based Theories

These theories explain gamification based on workplace-related characteristics and behaviors. Empirical evidence for only two theories was found for this section, though many theoretical papers have discussed other theories. The job characteristic model proposes five basic job characteristics - skill variety, task identity, task significance, autonomy, and feedback, which affect the outcome of the tasks performed by employees at the workplace (Hackman and Oldham, 1974). Various arguments from the Job characteristic theory have been used to extend the model to gamification. The two-factor theory states that certain factors in the workplace called hygiene factors contribute to job satisfaction or dissatisfaction at the workplace (Herzberg, 1968).

Surprisingly, there is a lack of work on workplace-based theories. While understanding gamification at the workplace, the work setting needs to be studied in more detail, and workplace-specific needs and motivations should be the focus of theory. While these have been addressed to some extent by using personal behavior theories, the specificity of workplace setting is missing in those perspectives. This provides evidence that the field still needs to develop a more substantial theoretical understanding of gamification.

3.1.4 Goal-based Theories

Goal setting has been cited as an essential aspect of successful gamification design and implementation (Landers et al., 2017). The last group consists of those theories that are dependent on goal-setting processes and behavior. A total of four theories have been identified in this group. The applicability of goal setting and goal-based theories to gamification arises from goal setting being an integral part of gamification. Goal setting theories focus on the characteristics of goals rather than on individuals. In most workplace settings, clear objectives are well established in the form of key performance indicators (KPI) and deliverables. These scenarios can easily leverage from goal-based theories. Even though goal-setting theories have been used to some extent in the literature, a more in-depth analysis of goal characteristics and their effect on gamification needs to be undertaken.

The goal-setting theory posits that individuals can be motivated towards a goal with improved performance by developing an action plan for the tasks involved (Locke and Latham, 1990). Feedback is an essential principle of the goal-setting theory, which has also been cited as an important concept in various gamification studies (Morschheuser et al., 2017; Perryer et al., 2019; Brouwer and Conboy, 2017). Social interdependence theory proposes that the structuring of goals affects the outcome of a process and individual behavior (Johnson and Johnson, 2005). It classifies the goal structuring based on three basic categories - individual, cooperative and competitive features. This presents another example of game-based theories used to explain gamification.

	References	Freq.
Personal Behaviour Theories		
Self Determination Theory	Lombriser et al. (2016), Coatalem (2017), Herranz et al. (2017), Brouwer and Conboy (2017), Lithoxoidou et al. (2017), Kotsopoulos et al. (2017), Schuldt and Friedemann (2017), Suh and Wagner (2017), Kotsopoulos et al. (2018), Muñoz et al. (2018), Jain and Dutta (2019), Perryer et al. (2019), Suh (2019), Oppong-Tawiah et al. (2020)	14
Flow Theory	Ergle (2015), Korn et al. (2015), Lee et al. (2016), Roh et al. (2016), Chow and Huang (2017), Suh et al. (2017), Herranz et al. (2017), Korn and Rees (2019), Kotsopoulos et al. (2017), Schuldt and Friedemann (2017), Nivedhitha and Manzoor (2019)	11
Affordance Theory	Fischer (2017), Morschheuser et al. (2017), Singhsomransukh and Heo (2017), Suh et al. (2017), Suh and Wagner (2017), Suh (2019)	6
Hierarchy of Needs	Chow and Huang (2017), Schuldt and Friedemann (2017), Nivedhitha and Manzoor (2019)	3
Theory of Aesthetic Experience	Suh et al. (2017), Nivedhitha and Manzoor (2019)	2
Expectancy theory	Perryer et al. (2019), Brouwer and Conboy (2017)	2
Attribution theory	Nivedhitha and Manzoor (2019)	1
Social cognitive theory	Nivedhitha and Manzoor (2019)	1
Information Success Model	Coatalem (2017)	1
Cultural-Historical Activity Theory	Oberprieler (2018)	1
Values Beliefs Norms theory	Kotsopoulos et al. (2017)	1
Personality profiling model	Yilmaz and O'Connor (2016)	1
Cognitive evaluation theory	Perryer et al. (2019), Suh (2019)	1
Self-efficacy theory	Brouwer and Conboy (2017)	1
Fogg Behaviour Model	Herranz et al. (2017)	1
Behavioural economic theory	Lowensteyn et al. (2019)	1
Mood Management theory	Perryer et al. (2019)	1
Broaden-and-build theory	Nivedhitha and Manzoor (2019)	1
Theory of hedonic value	Suh and Wagner (2017)	1
Organismic integration theory	Suh (2019)	1
Game-based Theories		
Octalysis framework	Swacha (2016), Göschlberger and Bruck (2017), Herranz et al. (2017), Singhsomransukh and Heo (2017), Herranz et al. (2018), Herranz and Colomo (2018)	6
MDA framework	Cunha et al. (2016), Garcia et al. (2017), Kotsopoulos et al. (2017, June), Singhsomransukh and Heo (2017), Nivedhitha and Manzoor (2019),	5
Bartle user-types	Garcia et al. (2017), Herranz et al. (2017), Herranz and Colomo (2018), Kotsopoulos et al. (2018)	4
Hexad user-types model	Kotsopoulos et al. (2017)	2
Drama theory	Yilmaz and O'Connor (2016)	1

Game maturity model	Chow and Huang (2017)	1
Workplace-based Theories		
Job characteristic model	Liu et al. (2018), Brouwer and Conboy (2017), Perryer et al. (2019) , Oppong-Tawiah et al. (2020)	4
Four-drive theory	Perryer et al. (2019), Brouwer and Conboy (2017)	2
Equity theory	Perryer et al. (2019), Brouwer and Conboy (2017)	2
Need Theory	Brouwer and Conboy (2017), Jain and Dutta (2019)	2
Two-factor theory	Liu et al. (2018)	1
Goal-based Theories		
Goal setting theory	Brouwer and Conboy (2017), Morschheuser et al. (2017), Perryer et al. (2019)	3
Social interdependence theory	Morschheuser et al. (2017)	1
Tiny Habit theory	Lithoxoidou et al. (2019)	1

Table 1. Theories used in gamification research

3.2 Causal-chain framework for gamification

A causal-chain framework has been developed, which is an ordered sequence of the antecedents, moderators, mediators, and outcomes, as suggested by Ngai et al. (2015). These are discussed in further detail in the following sections. The framework is presented in Figure 2.

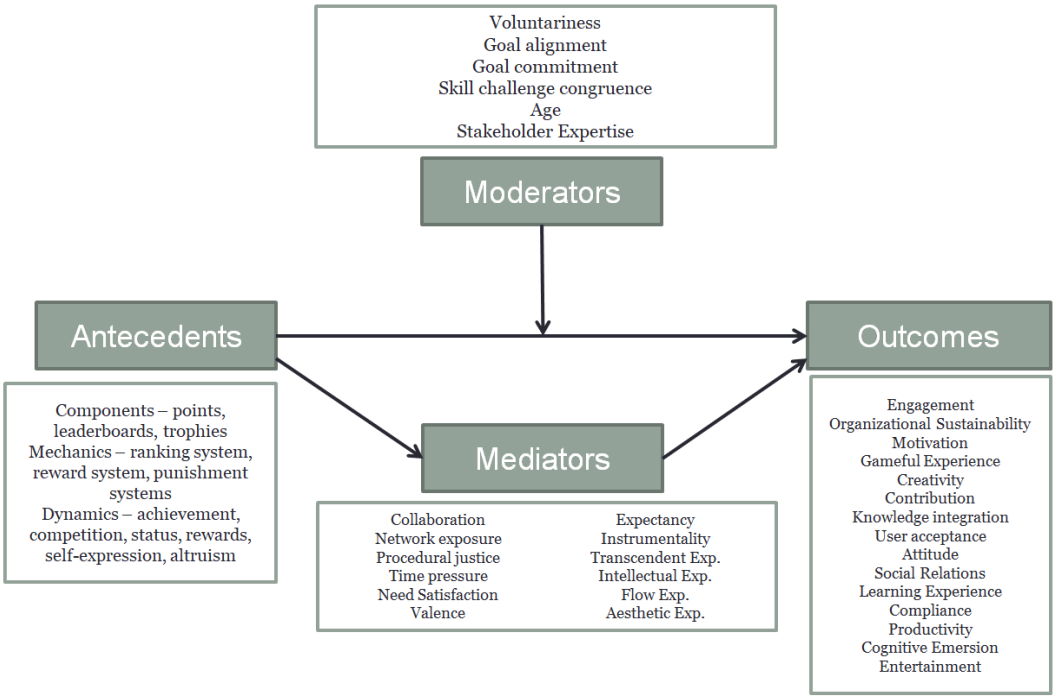

Figure 2: The Causal-chain framework

3.2.1 Antecedents

An antecedent is an input in a conceptual model that precedes the outcome and is pre-requisite for the same. The antecedents discussed in the literature can be classified into three categories – components, mechanics, and dynamics. Components are the most basic game elements that are used to implement gamification. Examples of these are points, badges, leaderboard, and progress. These form the core of the gamification design and implementations. Game mechanics are mechanisms that emerge out as a combination of game components. These include the rules, regulations, and features present in the gamified environment (Khaleel et al., 2016). They form an umbrella over multiple

gamification components and make a larger system, such as the reward system or ranking systems. Finally, game dynamics are the participant's responses that emerge in a gamified environment and are the source of the emotions responsible for the motivation of the participant (Khaleel et al., 2016). Rewards, achievement, status, competition, self-expression, and altruism have been identified as the six primary dynamics of gamification (Bunchball, 2010).

All three forms of elements can be used to represent gamification. The three elements form an abstract ladder. As we move up the ladder, the elements become more abstract. While on one end, the components such as levels, points, badges can be observed in a gamification implementation; on the other end, dynamics are entirely abstract and psychological.

3.2.2 Moderators and Mediators

A moderator is a variable or construct that affect the relationship between the outcome and antecedent. It dictates the strength of the relationship and controls its intensity. Six major moderators were identified in the analysis which include voluntariness, goal alignment, and skill challenge congruence presented by Perryer et al. (2016), goal commitment (Landers et al., 2017), age (Hammedi et al., 2017), and stakeholders expertise (Lombriser et al., 2016).

Mediators are the variables that mediate the effect between an outcome and an antecedent. It is responsible for the indirect effects that the antecedent causes on the outcome. The mediators found in the literature are valence, expectancy, instrumentality, procedural justice, time-pressure (Brouwer and Conboy, 2017), flow experience, aesthetic experience (Suh et al. 2017), intellectual experience, and transcendent experience (Nivedhitha and Manzoor, 2019), collaboration, and network exposure (Nivedhitha and Manzoor, 2019). Each of these variables have been found to transfer the effects of gamification to the desired outcomes.

Voluntariness is the perceived choice of independence of a user for using a gamified environment. It represents the willingness of the user to use the system. Kamel et al. (2017) provide evidence of how pre-conceived notions of gamification can affect outcomes, which can be assumed to affect voluntariness. Goal alignment is the congruency between the participant's personal goal and the goal of the gamified environment, while goal commitment is an individual's dedication towards the designated goal. Both the variables represent the same theme of setting alignment between the goals of the individual and that of the gamified environment. Unless the two objectives are in sync with each other, the motivations to achieve the specified outcome might be limited in a gamified environment. If the goal alignment is high, it leads to higher goal commitment. High goal commitment affects performance positively, even with challenging goals (Landers et al., 2017).

Skill challenge congruence is the gamified environment's ability to align the skill level of the participant and the challenge level of the task in the gamified environment. If the participants find the objectives too difficult, they are likely to get demotivated and underperform. On the other hand, if the objectives are too easy, they might not provide the necessary challenge to engage the participants. Stakeholder's expertise affects the outcome similarly. Age becomes a significant moderator when analyzing gamification contexts. Gamification is expected to introduce an element of play in the gamified environment, which is preferred by the younger audiences (Hammedi et al., 2017).

3.2.3 Outcomes

Outcomes are the consequences that form the results of a conceptual framework. The outcomes found in the analysis are discussed next. Several outcomes have been studied in these studies. First, behavioral outcomes such as engagement and motivation have been studied, which directly affect the employee's willingness to participate in the tasks (Hussain et al., 2018; Suh et al., 2017). Second, outcomes that affect the organization on a macro level have been studied. These include organizational sustainability, knowledge integration, and knowledge sharing (Zikos et al., 2019; Singhsomransukh and Heo, 2017). Third, individual-level outcomes have been explored. Examples of these are creative ideation, user acceptance of gamified environment, and the gameful experience itself (Zikos et al., 2019; Nivedhitha and Manzoor, 2019; Brouwer and Conboy, 2017). Finally, constructs that measure the efficiency or performance of the user have been studied in the literature as an outcome. Example of this are contribution, attitude, and compliance of employees (Suh and Wagner, 2017; Swacha, 2016; Prause and Jarke, 2015).

4 Research Implications

There are several implications of our research study. Firstly, in terms of the theories used, most studies have applied personal or individual level theories to explain the phenomenon. Substantial reliability

on such theories presents a research gap in the field, representing a lack of focus on organizational level theories and context-specific theories. More work-related theories need to be used to study the phenomenon as the context of the gamification environment has been cited to be an essential criterion for its effectiveness (Richards et al., 2014).

Second, a more detailed understanding of the goal-setting process needs to be obtained to understand its effect on gamification success. While some goal setting themes emerge in moderating variables, a more in-depth analysis of variables and goal-centric outcomes will shed more light on this aspect of the phenomenon.

Third, a focus on moderators specific to the workplace is needed as the moderating variables form an important part of the relationship between the outcome and antecedent, but the extant literature lacks a focus on these moderators. The importance of moderators emerges in the context, and while implementing gamification at the workplace, the characteristics of the context need to be analyzed further. This will bring in further insights into the relationship between the antecedents and the expected outcomes.

Fourth, an analysis of the cultural aspects of gamification has not been explored in the literature. The cultural aspects will shed light on what difference the gamification implementations will have in different cultural settings. Lastly, as the field evolves, a broader, more specific theory relating to gamification needs to be developed. The causal-chain framework present in the study is an attempt in the direction.

5 Conclusion

This literature review provides an analysis of the various relationships and constructs that have been studied in the recent gamification literature. The antecedents, consequences, and the intermediate moderators and mediators have been identified from the literature. Also, a review of the theories has been provided with a taxonomy. The causal-chain framework details the relationship that has been studied in the recent literature with individual moderators and mediators.

Gamification holds the power of changing the engagement and motivation levels of employees in the workplace. The current study presents a review of 44 articles from the recent literature and analyses the theories, constructs, and the framework presented. It also presents a unified framework to summarize the relationships between different constructs and give an overview of the phenomenon. One of the primary limitations of the study is that the literature review may not be exhaustive, and a more detailed review can further add to the unified framework. Also, more workplace-related keywords can be used to further expand or narrow the review process to improve the scope of future studies.

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